

# STRUCTURED DATA & THE FUTURE OF EDUCATIONAL MATERIAL

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Disruptive Technology Director

Elsevier Labs | @elsevierlabs

**Thanks to: Mike Lauruhn, Mary Millar , David Kuilman**

ELSEVIER

# WORLD LEADER IN DIGITAL INFO SOLUTIONS

Over the last

**50 years**

the majority of Noble Laureates have published with Elsevier

Founded over

**130 years ago**

Employ over

**7,000 employees**

in 24 countries

Published over

**330,000 articles**

in 2013

Received over

**1 million submissions**

in 2013

Work with over

**30 million**

Scientists, students, health & information professionals

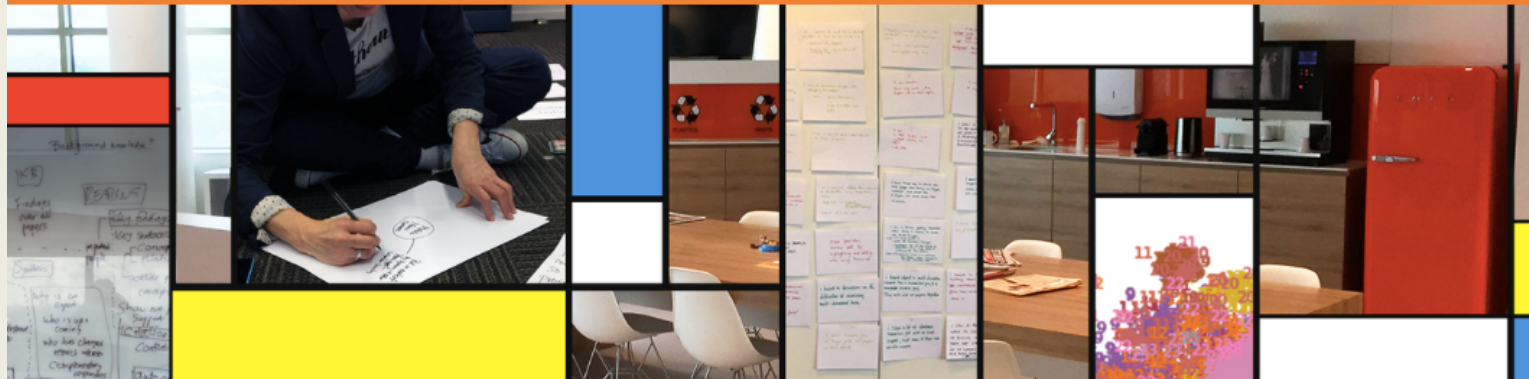
Over **53 million**

items indexed by

Scopus

ELSEVIER

	CAPABILITIES	CONTENT	SOLUTIONS			
			Elsevier Research Intelligence	Elsevier R+D Solutions	Elsevier Clinical Solutions	Elsevier Education
		Elsevier eBooks, Online Journals, Databases  Publishes over 2,200 online journals & over 10,000 e-books	Provides universities, governments, and research institutions with the resources and insights to improve institutional research strategy, management, and performance.	Helps corporate researchers, R+D professionals, and engineers improve how they interact with, share, and apply information to solve problems using our digital workflow tools, analytics, and data	Helps medical professionals apply trusted data and sophisticated tools to make better clinical decisions, deliver better care, and produce better healthcare outcomes.	Helps educate highly-skilled, effective healthcare professionals, using the most advanced pedagogical tools and reference works.
		   	Pure SciVal	Knovel Geofacets Embase Reaxys	ClinicalKey ToxED	Mosby's Skills+
	PLATFORMS		ScienceDirect	Scopus	 MENDELEY	



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#### ElsevierLabs-People



Tweets from a list by Elsevier Labs

Tweets and retweets from the members of Elsevier Labs



Stanford NLP Group

12h

#### BLOGS

[Trip Report: ISWC 2015](#)

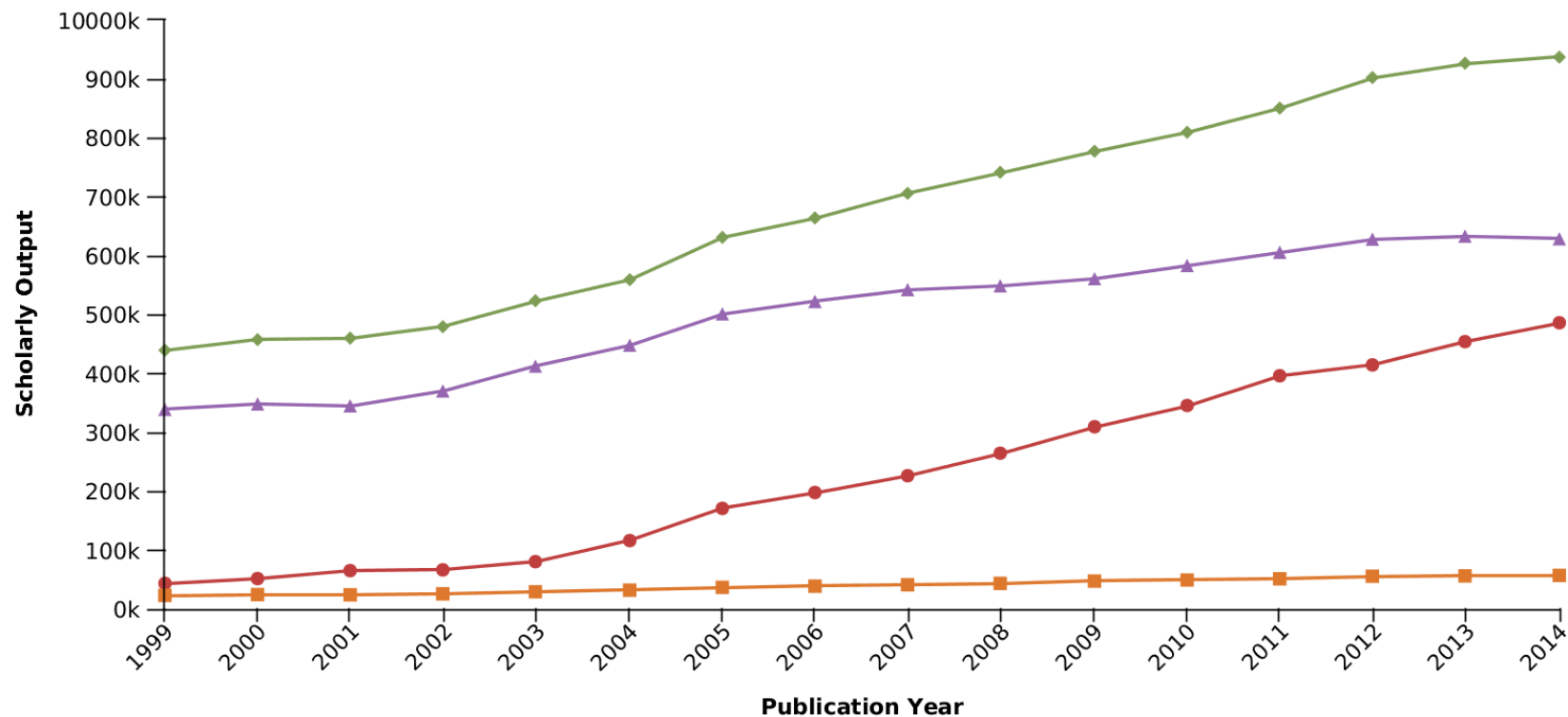
[Add a Comment](#)

Last week, I hung out in Bethlehem, Pennsylvania for the the 14th International Semantic Web Conference . Bethlehem is famous for the

#### CALENDAR & EVENTS

**LINKING LIFE SCIENCE DATA:  
FEB 18-19, VIENNA**

Feb 2, 2016

**Chart Legend**

● China [Country]    ◆ Europe [Group of Countries]    ■ Netherlands [Country]    ▲ United States [Country]



75 substances out of 98 reactions and 7000 bioactivities and 1010 targets and 476 citations

Filter by:

Substructure

Molecular Weight

Number of Fragments

Physical Data

Spectroscopic Data

Ecological Data

Natural Product

Availability

Availability in other DBs

LogP

H Bond Donor (HBD)

H Bond Acceptor (HBA)

Polar surface Area (PSA)

Highest clinical phase

Yield

Record Type

Reagent/Catalyst

Solvent

Reaction Type

No. of Steps

Heatmap

Reactions

Substances (Grid)

Substances (Report)

Targets

Citations

go to Page



Page 1 of 9



Limit to



Exclude



Export



Print



Zoom in



Zoom out



Hide

Sort by

No of References



Structure

Structure/Compound Data

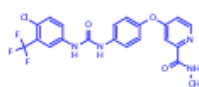
N° of preparations

All Preps | All Reactions

Available Data

Target

N° of r

Synthesize | Show Details  
Find similar**Chemical Name:**

4-({4-([4-chloro-3-(trifluoromethyl)phenyl]amino)carbonyl}amino)phenoxy)-N-methyl-2-pyridine carboxamide

**Reaxys Registry Number:** 9666200**CAS Registry Number:** 284461-73-0**Type of Substance:** heterocyclic**Molecular Formula:** C<sub>21</sub>H<sub>16</sub>ClF<sub>3</sub>N<sub>4</sub>O<sub>3</sub>**Linear Structure Formula:** C<sub>21</sub>H<sub>16</sub>ClF<sub>3</sub>N<sub>4</sub>O<sub>3</sub>**Molecular Weight:** 464.831**InChI Key:** MLDQJTXFUGDVEO-UHFFFAOYSA-N21 prep  
out of  
41 reactions.Druglikeness  
Bioactivity  
Identification  
Physical Data (26)  
Spectra (27)  
Use/Application (1898)Show  
Targets

448

Synthesize | Show Details  
Find similar**Chemical Name:**

[14C]-Sorafenib tosylate

**Reaxys Registry Number:** 11116227**Molecular Formula:** C<sub>7</sub>H<sub>8</sub>O<sub>3</sub>S\*C<sub>21</sub>H<sub>16</sub>ClF<sub>3</sub>N<sub>4</sub>O<sub>3</sub>**Linear Structure Formula:** C<sub>21</sub>H<sub>16</sub>ClF<sub>3</sub>N<sub>4</sub>O<sub>3</sub>\*C<sub>7</sub>H<sub>8</sub>O<sub>3</sub>S**Molecular Weight:** 637.036**InChI Key:** IVDHYUQIDRJSTI-UHFFFAOYSA-N**Highest Clinical Phase:** Marketed6 prep  
out of  
8 reactions.Druglikeness  
Bioactivity  
Identification  
Physical Data (18)  
Spectra (12)  
Use/Application (903)Show  
Targets

47

**Chemical Name:**N-(4-chloro-3-(trifluoromethyl)phenyl)-N'-(4-(2-(N-(methyl-d<sub>2</sub>)aminoformyl)-4-pyridyloxy)phenyl)urea19 prep  
out of  
21 reactions.Druglikeness  
Bioactivity  
IdentificationShow  
Targets

6

40 million reactions

75 million compounds

500 million facts

www.reaxys.com/reaxys/secured/paging.do?performed=true&action=restore

Reaxys

75 substances out of 98 reactions and 7000 bioactivities and 1010 targets and 476 citations

HeatmapReactionsSubstances (Grid)Substances (Report)TargetsCitations

go to Page 1 of 9

Filter by:

Substructure

Molecular Weight

Number of Fragments

Physical Data

Spectroscopic Data

Ecological Data

Natural Products

Availability

Availability in other DBs

LogP

H Bond Donor (HBD)

H Bond Acceptor (HBA)

Polar surface Area (PSA)

Highest clinical phase

Yield

Record Type

Reagent/Catalyst

Solvent

Reaction Type

No. of Steps

Structure

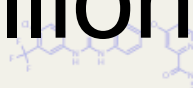
Structure/Compound Data

N° of preparations  
All Preps | All Reactions

Available Data

Target

N° of m



Synthesize | Show Details  
Find similar

Chemical Name:  
4-((4-chloro-3-(trifluoromethyl)phenyl)amino)carbonylamino)phenoxy)-N-methyl-2-pyridine carboxamide

Reaxys Registry Number: 9666200

Chemical Formula: C<sub>21</sub>H<sub>16</sub>ClF<sub>3</sub>N<sub>4</sub>O<sub>3</sub>

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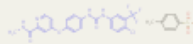
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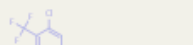
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Identification

Show  
Targets

6

---

**HOW TO ENABLE LEARNERS TO ACQUIRE  
AND APPLY ALL THIS KNOWLEDGE  
EFFECTIVELY?**

---

# THREE PROJECTS

1. Nursing education
2. Linked data for learning about linked data
3. Using research resources to facilitate education



## The U.S. Is Running Out of Nurses

The country has experienced nursing shortages for decades, but an aging population means the problem is about to get much worse.



REBECCA GRANT | FEB 3, 2016 | HEALTH

According to the Bureau of Labor Statistics, **1.2 million vacancies** will emerge for registered nurses between 2014 and 2022.

By 2025, the shortfall is expected to be “more than **twice as large** as any nurse shortage experienced since the introduction of Medicare and Medicaid in the mid-1960s,” a team of Vanderbilt University nursing researchers wrote...

# ELSEVIER'S SHERPATH



# Product Design (Student facing)



## 1. PERSONALIZED LEARNING TUTOR

Reminders and prioritization assistance to help students optimize available study time and balance test prep with assignment completion.

## 2. ENGAGING LEARNING EXPERIENCE

Media-rich learning instructionally-designed to convey essential information through bite-sized content, quizzes, activities, and feedback.

## 3. QUIZZING COACH

Test prep featuring content recommended based on upcoming goals, time-available, and current areas of weakness.

## PROBLEMS ADDRESSED

*I have **too much content** to consume.  
I have **limited time to study**, so I need  
to know where to concentrate.*

**Potassium Imbalance - Post Assessment**

YOUR SCORE  
**92%**

**WELL DONE.**

Your class scored on average 75% and people you follow are around 88%.

Want perfect scores? Revisit the topics below.

**TOP SCORE**  
8.0/8.0  
1/2

**Topics to review later**

- ☒ Potassium is the major cation in intracellular fluid
- ☒ The Regulation Functions of Potassium

Show all topics

**ADD SELECTED TO MY PLAN** **REDO THE QUIZ**

**Good session**

Seems like you got better in a couple of topics. You can remove them from 'review' if you want.

**Mastered topics**

- ☒ The Function of Potassium in the Body
- ☐ Potassium Level Regulation
- ☐ Potassium Deficit: Hypokalemia
- ☐ Potassium Deficit: Hypokalemia

**KEEP THEM** **REMOVE THEM**

**< WEEK 13 >**

**YOUR PREPARATION FOR TOMORROW**

How much time do you have now?

15 30 45 **60** 90 \*\*\* MINUTES

**START NOW**

**FLUID & ELECTROLYTES**  
**Potassium Imbalance**  
10 MIN Due to Wednesday

**FLUID & ELECTROLYTES**  
**Alterations in Calcium, Phosphate, and Magnesium Balance**  
23 MIN Due to Wednesday

**INTRAVENOUS MEDICATION**  
**Electrolyte Monitoring**  
8 MIN Due to Wednesday

**INTRAVENOUS MEDICATION**  
**Starting an IV**  
10 MIN Due to Thursday

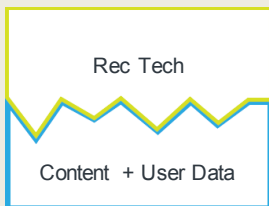
topics and 2 skills - estimated duration 61 min

**Only 60 min of prep is required now.**  
You made really good progress yesterday. Keeping up this pace will save you time over the weekend.

# WHAT IS A RECOMMENDER?

Recommenders are tools for interacting with large and complex information spaces. They provide a personalized and prioritized view of items in the space.

Recommendation engines come in different types: **content-based**, **knowledge-based**, **collaborative-filtering**, and **hybrids**.



**Content-based** looks for items that users view or purchase together

**Knowledge-based** applies metadata to make inferences about the similarity of items

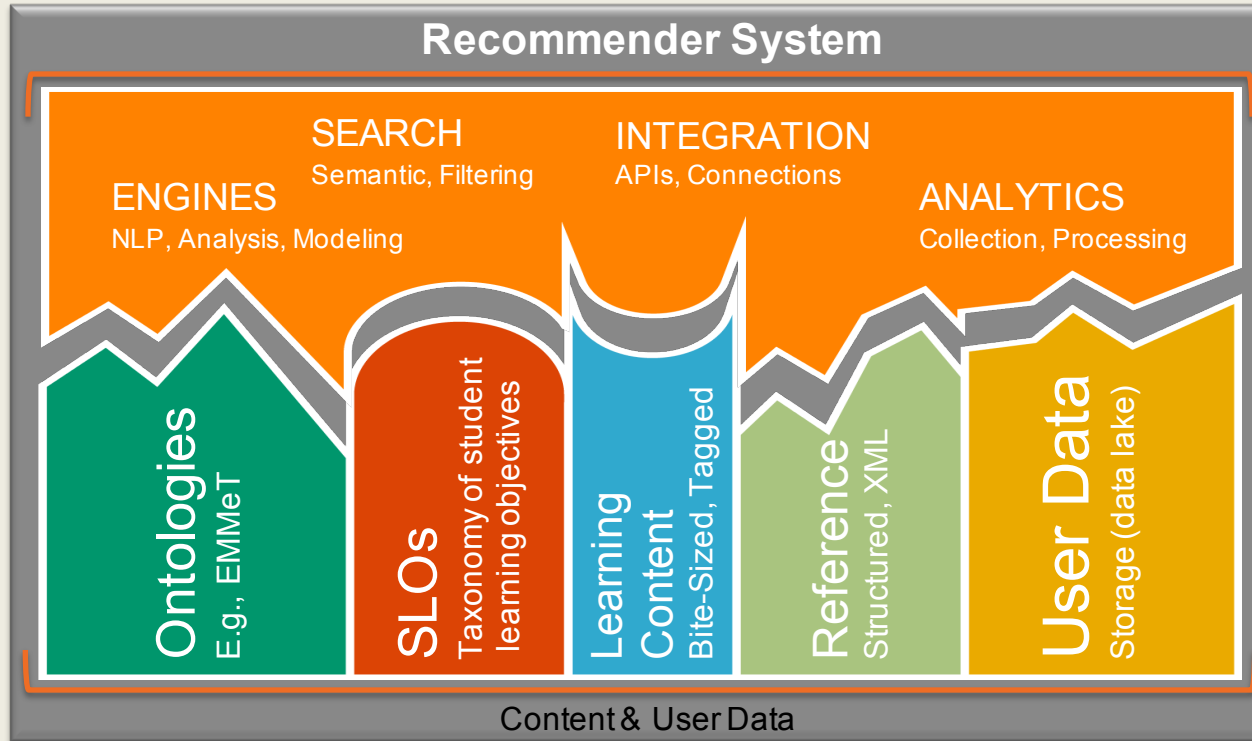
**Collaborative-filtering** looks for similarity among users to make item recommendations

**Hybrid** systems combine capabilities of different types and reconcile the recommendations from each

**For most businesses, recommenders are essential for surfacing items to consumers.  
For education, recommenders enable adaptive and enhanced learning.**



# OUR RECOMMENDER COMPOSITION



Our **Recommender System** is composed of the **recommendation technology** (engines, analytics, search, etc.) and **content & user data**.

To make **effective** recommendations for our use cases, the system needs to be built for the content & user data in our domain.

In our own system, **technology is built to match the content**.

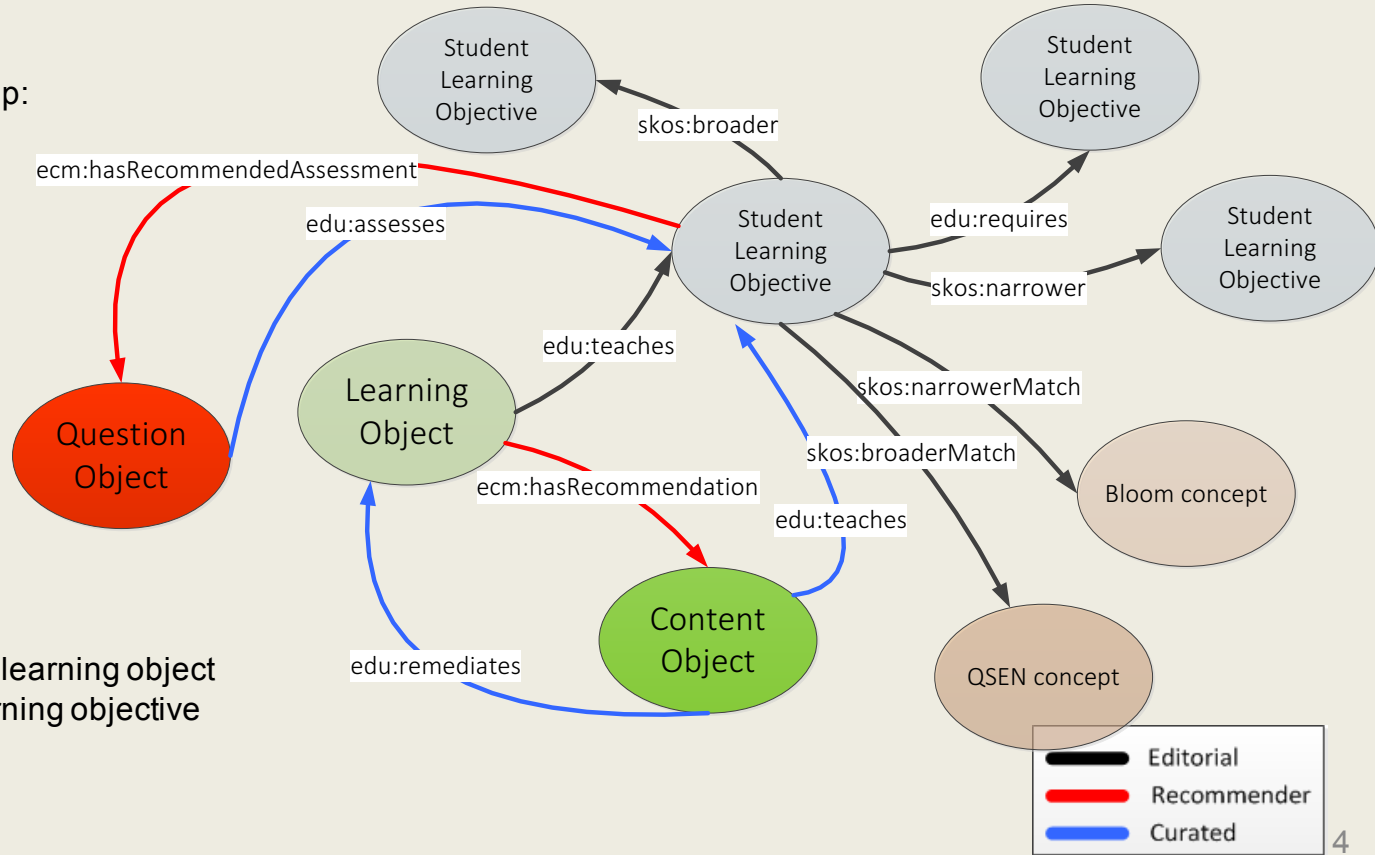
# Discovery using Recommender algorithms

Recommender algorithms can help:

- Identify test banks
- Alternate content in books
- Alternate content for learning objective

Manual, expert curation can help:

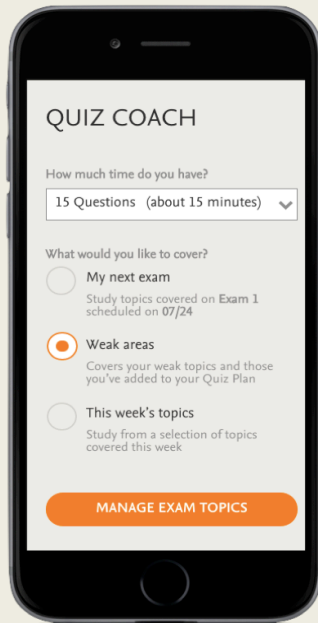
- Set questions to objectives
- Set remediation content for a learning object
- Set alternative content to learning objective



# QUIZ COACH WORKED EXAMPLE

## User Flow

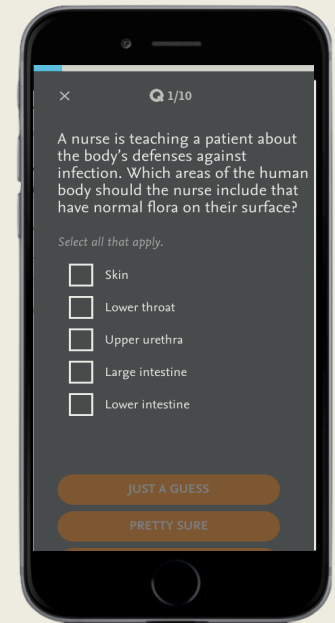
1. Student chooses to take **15 questions** on their **Weak Areas**, covering **Chain of Infection**
2. Quiz Coach service generates a quiz using the Recommender



Recommender fills SLO “slots” from a pool of responses (questions) for each SLO.

Constraints:

1. **Time** – Total time available (selected), time per question
2. **Depth** – Prioritizes breadth over depth
3. **Novelty** – Unseen, Incorrect, Skipped/Delivered/Unanswered, Correct
4. **Difficulty** – increasing order or difficulty range
5. **Content preference** – source of questions

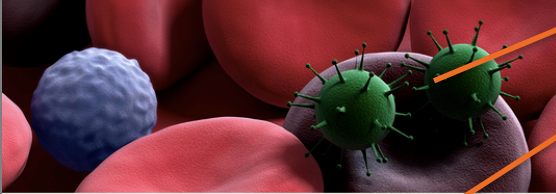


# HOW SHERPATH USES CONTENT

< LESSON MENU

estimated finish: 32 MIN

## MECHANISMS OF DEFENSE



### INFLAMMATORY RESPONSE

The second line of defense is the **inflammatory response**.

If inflammation becomes systemic, signs include fever (caused by prostaglandins acting on the hypothalamus), chills, malaise, and altered mental status. Inflammation causes the body to mount the third defense, which is the **immune response**.

IM CONFUSED, EXPLAIN IT DIFFERENTLY.

In other words ...

**Inflammation**, also called natural immunity, provides immediate protection against the effects of tissue injury and invading foreign proteins. The purpose of inflammation is to start blood vessel and tissue reactions to rid the body of harmful microorganisms and other invaders. Inflammation differs from immunity in two important ways:

1. Inflammatory protection is **immediate but short term** against injury or invading organisms. It does not provide true immunity on repeated exposure to the same organism and cannot be transferred to another person.
2. Inflammation is a **nonspecific body defense** to invasion or injury and can be started by almost any event, regardless of where it occurs or what causes it.

```
<h1>Mechanisms of defense</h1>
<aside class="content-img-fluff">
  
</aside>
<h2>Inflammatory Response</h2>
<p>
  The second line of defense is the< strong>inflammatory response</strong> .
<LOID: "LO_21_A_19">
<SLOID: "SLO_21_A_19">
</span>
```

Learning Content

Blue-Size, Tagged

apiVersion: "0.2",

rid: "febbd407-21a3-4191-c25d-6cd1916bc44e",

route: "Confused"

params: {

modelID: "VETTED",

userID: "Student001",

courseID: "TNF",

SLOID: "SLO\_21\_A\_19"

}

hints: {

"istTopicSLOs": {

"LO\_21\_A\_19",

},

"istKeyPhrases": {

"Immune response",

},

}

SLOs

Learning Objectives

</ce:para>

</ce:section>

<ce:section id="s0170">

<ce:section-title id="st0180">In Other Words</ce:section-title>

<ce:para id="p0180">Inflammation, also called natural immunity,

<ce:para id="p0585">Inflammation protection is immediate but sho

<ce:para id="p0585">Inflammation is a nonspecific body defense to invasion or injury

</ce:section id="s0175">

<ce:section id="s0035">

</ce:section id="s0142">

Ontologies

e.g. clinical

med:diseases

med:procedures

med:symptoms

med:anatomy

med:drugs

med:clinical-finding

emsem:local-symptoms

med:wellness-and-lifestyle

Reference

Structured XML

In EOLS, new and legacy content are integrated on every page. Users consume content designed for digital learning, but can also request “More Details” straight from ELS book content when they’re confused.

**Learning Content** is purpose-built to fit our content model (individual learning objects that teach or assess learning objectives) and tagged to SLOs.

Our **SLOs** are a new unified taxonomy of domain learning outcomes that map didactic and clinical objectives.

**Reference content** is available as structured XML for each of our 53 core Nursing titles

**EMMeT** is used to text mine the XML for relevant health concepts to save manual tagging

# CONTENT MODEL COMPONENTS

- Elsevier Enterprise Content Model ontology

- 40+ properties
- 20 datatypes
- 10 Content types
- 20 Asset types

- Adaptive Learning ontology

- Recommendation
- Teaching
- Assessing
- Remediation

- SKOS ontology

- 3 third-party vocabularies: QSEN, Bloom etc.

- QTI 2.1 compliant schema

- XHTML5 schema

- 50+ data-type attribute definitions

- Student Learning Objective ontology

- SKOS ontology extended with 2 properties

- Multi-media assets incl. Text Time based Markup Language

## Quality and Safety Education for Nurses (QSEN)

Competency:
Patient-Centered Care
Teamwork and Collaboration
Evidence-Based Practice
Quality Improvement
Safety

### ASSESSMENT SETTINGS

ASSESSMENT NAME  
**POP QUIZ**

QUESTION TYPE DISTRIBUTION

25%	35%	10%	40%
12	12	12	12

COVERED MODULES

- ☒ Fluid and Electrolytes
- ☒ Nutrition
- ☐ Sleep
- ☐ Oxygenation
- ☐ Risk

### YOUR SCORE

**92%** **WELL DONE.**

Your class scored on average 75% and people you follow are around 88%.

Want perfect scores? Revisit the topics below.

#### Topics to review later

- ☒ Potassium is the major cation in intracellular fluid
- ☒ The Regulation Functions of Potassium

Show all topics

**ADD SELECTED TO MY PLAN** **REDO THE QUIZ**

### FUNDAMENTAL NURSING SKILLS

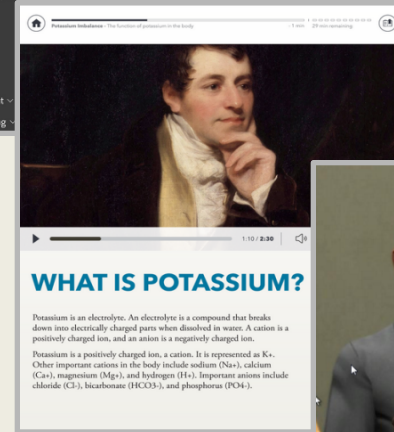
WEEK 1

- TUE FLUID & ELECTROLYTES
- THU NUTRITION

POP QUIZ

WEEK 2

- THU SLEEP



---

# THE ROLE OF STRUCTURED DATA

- Content needs be organized/tagged at a fine grained level
- Content organization helps drive recommendation
  - Allow for the recommendation of specific pieces of content
  - Allow for the combination of multiple pieces of content to support a student's journey

## Welcome



### Theory & Background

The primary goal of the RDF-modeled Competency Index for Linked Data is to provide a means for mapping learning resources descriptions to the competencies those resources address to assist in finding, identifying, and election resources appropriate to specific learning needs. — [Learn More](#)

### Featured Resource

[Learn About SPARQL 1.1](#)

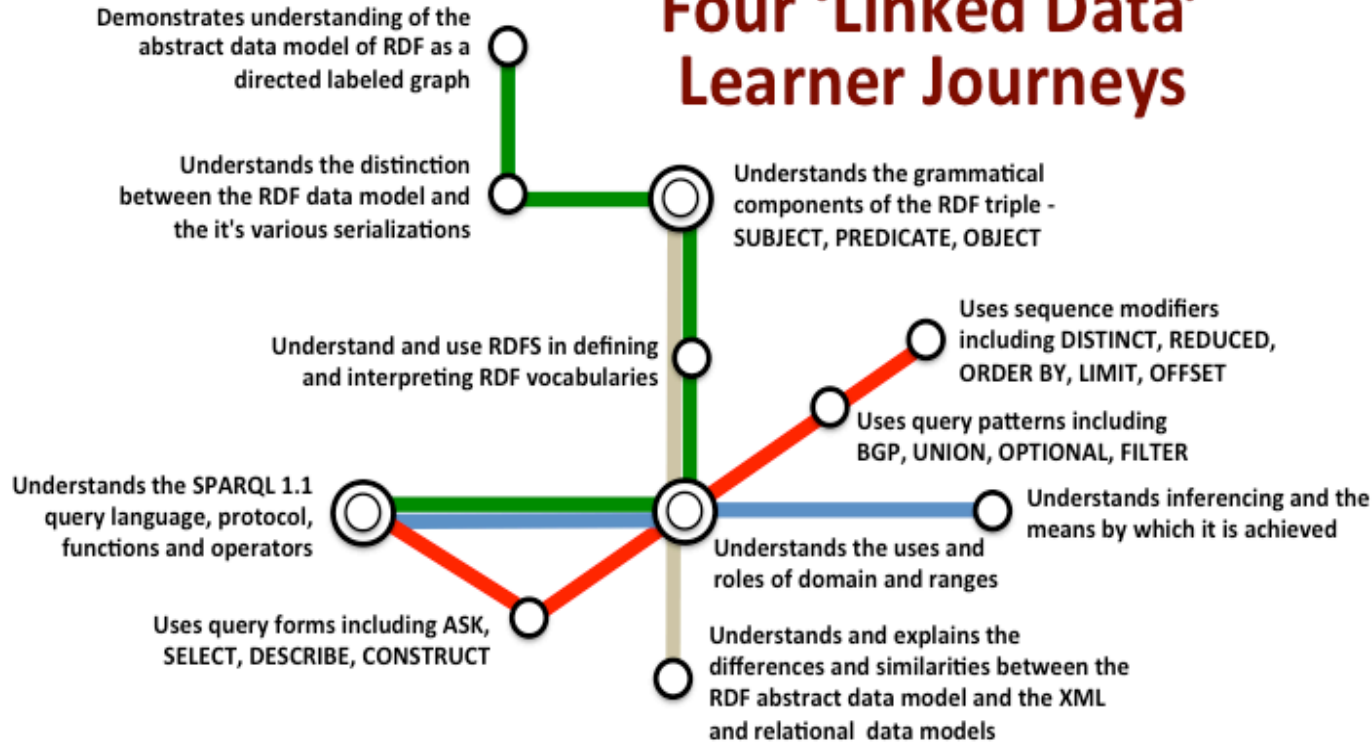
This S5 format slideshow details the changes made to the query language in SPARQL 1.1- it is not a basic introduction to SPARQL and assumes that the reader is already familiar with the basic functions of SPARQL 1.0.

### Recent Updates

Updated version (May 2016) of the LD4PE Competency Index available for review and feedback (5/24/2016)

Current version of the LD4PE Competency Index ready for review and feedback (1/26/2016)

# Four 'Linked Data' Learner Journeys







## Explore Learning Resources by Competency

### Browse by Competency

▼ How does this work?

► New Comp Index (177)

▼ Fundamentals of Resource Description Framework (96)

▼ Identity in RDF (23)

Knows that Uniform Resource Identifiers, or URIs (1994), include Uniform Resource Locators (URLs, which locate web pages) as well as location-independent identifiers for

► physical, conceptual, or web r (4)

Knows that anything can be named with Uniform Resource Identifiers (URIs), such as agents, places, events, artifacts, and

► concepts. (19)

Understands that a "real-world" thing may need to be named with a URI distinct from the URI for information about that thing. (0)

► Recognizes that URIs are "owned" by the owners of their respective Internet domains. (0)

**Competency:** Knows That Uniform Resource Identifiers, Or URIs (1994), Include Uniform Resource Locators (URLs, Which Locate Web Pages) As Well As Location-Independent Identifiers For Physical, Conceptual, Or Web Resources.

### Introduction To Linked Data: Background Technologies And Standards, Motivating Application Scenario

This module introduces the main principles of Linked Data, the underlying technologies and background standards. It provides basic knowledge for how data can be published [...]

★★★★★ (2 user rating)

By [Abi Evans](#) | September 15th, 2015 | Comments Off on Introduction to Linked Data: Background Technologies and Standards, Motivating Application Scenario

### Multi-Agent And Semantic Web Systems: Linked Open Data

This slide presentation of lecture material was used as part of a course given at The University of Edinburgh School of Informatics. This lecture looked [...]

★★★★★ (1 user rating)

By [Abi Evans](#) | November 12th, 2015 | Comments Off on Multi-Agent and Semantic Web Systems: Linked Open Data

[Read More >](#)

# Introduction to Linked Data: Background Technologies and Standards, Motivating Application Scenario

## In Saved Sets

What's This?

## Tags

alignment

AngularJS

application profiles

ASN classes

ASN competency framework

ASN Description Language

ASN model

ASN ontology

ASN properties

community profiles

competency framework

descriptionset profile (DSP)

extensibility

JSON

Linked Data Fragments

LRMI

querying RDF

strength of fit

< Previous Next >

## Introduction To Linked Data: Background Technologies And Standards, Motivating Application Scenario

This module introduces the main principles of Linked Data, the underlying technologies and background standards. It provides basic knowledge for how data can be published over the Web, how it can be queried, and what are the possible use cases and benefits. As an example, we use the development of a music portal (based on the MusicBrainz dataset), which facilitates access to a wide range of information and multimedia resources relating to music. The module also includes some multiple choice questions in the form of a quiz, screencasts of popular tools and embedded videos. Course link (includes screencasts and exercises): <http://www.euclid-project.eu/modules/chapter1>. NOTE: First half of lecture has slides and a table of contents; second half does not.

**URL:** [http://videolectures.net/eswc2013\\_hogan\\_mcginnis\\_linked\\_data/](http://videolectures.net/eswc2013_hogan_mcginnis_linked_data/)

**Keywords:** Query, Ontology, Vocabulary, RDF, Linked Data Principles, Web of Data, Semantic Web

**Author:** Hogan, Aidan

**Publisher:** videolectures.net

**Date created:** 2013-11-05 05:00:00.000

**Language:** <http://id.loc.gov/vocabulary/iso639-2/eng>

**Time required:** P75M

**Educational use:** instruction

**Educational audience:** teacher-educationSpecialist

**Interactivity type:** expositive

Favorite ☆

• Competencies

- Knows that Uniform Resource Identifiers, or URIs (1994), include Uniform Resource Locators (URLs, which locate web pages) as well as location-independent identifiers for physical, conceptual, or web r
- Understands RDF serializations as interchangeable encodings of a given set of triples (RDF graph).
- Understands that resources are declared to be members (instances) of classes using the property `rdf:type`.

---

# THE ROLE OF STRUCTURED DATA

- Central aggregation enables the location of material
- Structured data eases aggregation especially if produced by multiple providers
- Structure enables a separation between defining the learning goals/objectives and the variety of content that can support that

# Linking Web for Data Education

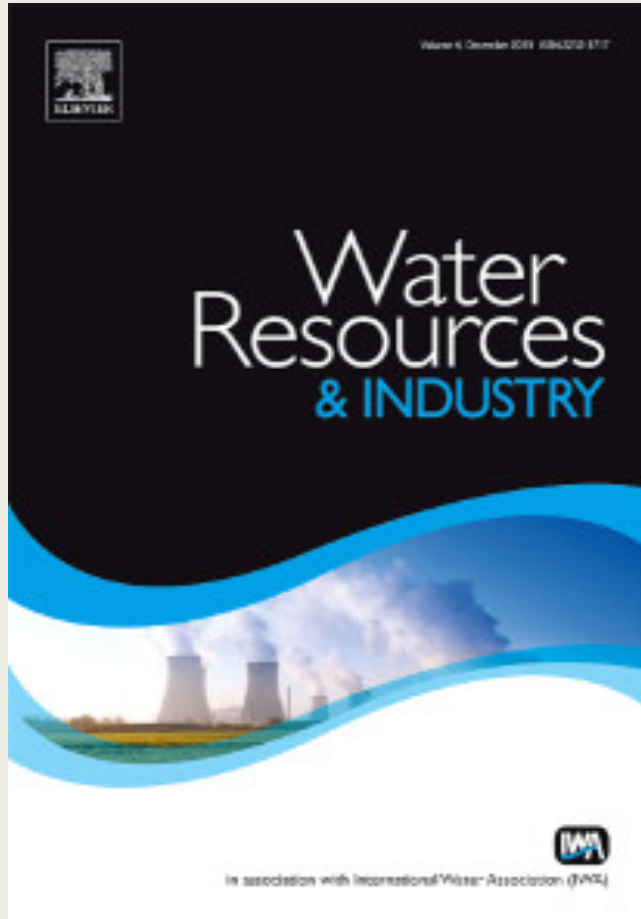



What's the role of academic / research content in education?

# Linked Education Cloud

The Linked Education Cloud is a repository/catalogue of Web datasets relevant to educational applications. It is provided according to the standard of the Web of Data, and is constructed based on input from the [LinkedUp Community](#). It is especially meant to support participants to the [LinkedUp Challenge](#), including in particular the two focused tracks of the current [Vici Competition](#) (see below).

[Browse The Data](#)





water  
footprint  
network

Newsroom

English

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## Water footprint statistics (WaterStat)

Water footprint statistics have many uses – in Water Footprint Assessment studies, awareness raising and research projects, to inform public policies or company business strategies. Because the water footprint statistics have been formulated using the same methodology – the Global Water Footprint Standard – they are comparable and can be used to tell the complex story of water. This is critically important and valuable to advancing the application of Water Footprint Assessment.

To ensure that scientifically rigorous water footprint statistics are available for everyone to use, the Water Footprint Network develops and maintains WaterStat, the world's most comprehensive water footprint database.

WaterStat currently includes five datasets:

- 1) Product water footprint statistics
- 2) National water footprint statistics



# Syllabus Discover Application:

- Prototype allows user to make connections between a syllabus and a corpus of journal article content
- Live demo (with LinkedUp Catalogue Water & Ecology content) available online
- Configurable code available on Github

## Water Ecology Syllabus

[Importance and values of water Wastes.](#)  
[physical and chemical characteristics of water](#)  
[ecological concepts and hydrologic](#)  
[ecosystem services](#)  
[human impacts through history to the present time and design a](#)  
[Land-Water Interactions](#)  
[Watersheds](#)  
[precipitation land use and the hydrologic cycle](#)  
[groundwater-surface water interactions](#)  
[water withdrawals](#)  
[surface hydrology](#)  
[hydraulics](#)  
[geomorphology](#)  
[hydrologic calculations for estimating runoff](#)  
[groundwater flowwater quality issues](#)  
[design approaches to managing infiltration and runoff](#)  
[watershed delineation and the design of green infrastructure for](#)

## Searching Elsevier Water Ecology Corpus

Search results for 'surface hydrology':  
Complementary methods to investigate the development of clogging within a horizontal sub-surface flow tertiary treatment wetland ( 0.36827922 )  
P.R. Knowles P. Griffin P.A. Davies  
A combination of experimental methods was applied at a clogged, horizontal subsurface flow (HSSF) municipal wastewater tertiary treatment wetland (TW) in the UK  
subsurface clogging which had resulted in undesirable surface flow. The three dimensional hydraulic conductivity profile was determined, using a....[Read more](#)

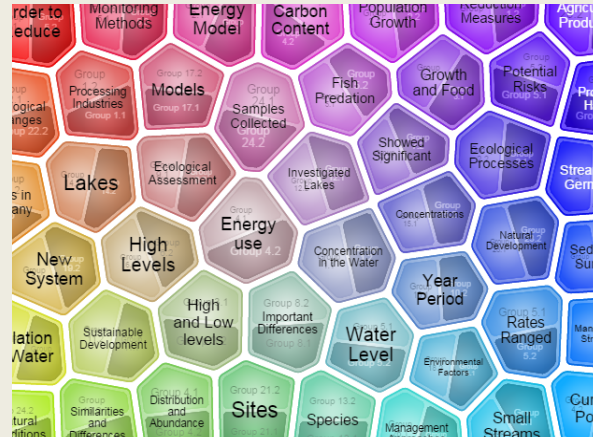
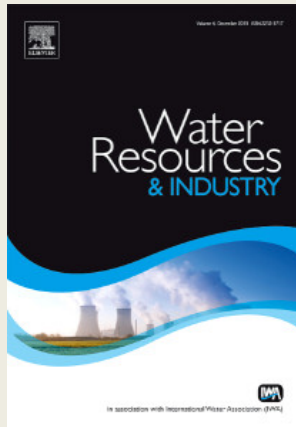
11th Magdeburg Seminar, October 2004 on Waters in Central and Eastern Europe: Assessment, Protection, Management Socioeconomic analysis within an interdisciplinary  
an integrated management of the Werra River Basin ( 0.14404237 )  
Jesko Hirschfeld Alexandra Dehnhardt Jörg Dietrich  
The implementation of the European Water Framework Directive is highly challenging to researchers, planning authorities and stakeholders. Presenting results from a  
Werra River in central Germany, this paper focuses on a socioeconomic analysis and its integration into a spatial decision support system (SDSS). Starting....[Read more](#)

11th Magdeburg Seminar, October 2004 on Waters in Central and Eastern Europe: Assessment, Protection, Management A hydrologic contribution to risk assessment  
Martin Helms Oleg Evdokimov Jürgen Thüringer Franz Nestmann  
The Caspian Sea (CS), the world's largest inland sea, may also be considered as large-scale limnic system. Due to strong fluctuations of its water level during the 20th  
highly vulnerable coastal zone, economic and environmental risk potentials have to be....[Read more](#)



## Clustering & Visualisation Discover Application:

- Prototype provides user a visualisation of concepts from a corpus of journal article content based on clustering
- Live demo (with LinkedUp Catalogue Water & Ecology content) available online
- Configurable code available on Github



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# THE ROLE OF STRUCTURED DATA

- Establishing structure enables new applications to be built
- Allows rethinking the role of existing content with respect to educational apps

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# CONCLUSION

- Education increasingly needs to be personalized, adaptive, on-demand and current
- Technology is central
- But technology requires the right kinds of content (bite size, reusable, malleable)
- Linked data standards and methods are an important mechanism for delivery

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